

## ASSESSING THE COMPETITIVENESS OF KAZAKH ECONOMY: DOES INDUSTRIAL-INNOVATIVE STRATEGY IMPROVE THE COMPETITIVENESS?

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### ABSTRACT

*This article assesses the competitiveness of the national economy of the Republic of Kazakhstan (by region) for the period of implementation of the industrial-innovative development strategy. Assessment method uses the index method to construct an aggregate index of competitiveness of the region by the aggregation of a number of different social and economic indicators. Calculations were carried out similarly to the methodology of the ratings of countries. The main feature of this method is to bring the different indicators (percent, absolute value, etc.) to one dimension in the range [0; 1]. Research results show that the level of the competitiveness in the Republic of Kazakhstan in general remains very low except in the capital city Astana and the former capital Almaty where competitiveness relatively higher but still it is in the middle of the range [0; 1]. Findings show that although Astana and Almaty are not industrial areas, but these areas have a relatively higher level of innovation and research. As a result, the combination of the existing infrastructure and industrial resources with innovation increases productivity in the region, which finally improves the quality of the life in the region. This means that the industrial-innovation factors are the basis for improving competitiveness. But, compared to the industrial and infrastructural indicators, innovation factors are more related to competitiveness. Overall, the industrial-innovative development affects the competitiveness of the region, which later forms the country's competitiveness.*

**Keywords:** *competitiveness of the economy, increasing the competitiveness of Kazakhstan, index method, regional ratings.*

### 1. INTRODUCTION

In the context of the need to reduce the dependence of the Kazakh economy from the demand to raw materials and world prices for them as well as the need to diversify the economy, industrial and innovative development was defined as a main direction of the economic policy of Kazakhstan. In this connection, Kazakhstan adopted a special strategy of industrial-innovative development for 2003-2015, which has later replaced with the State program of industrial-innovative development since 2010's (Decree of the President of the Republic of Kazakhstan, 2010).

Another area of Kazakh economic policy which is implemented in the interlinkages with the industrialization policy is competitiveness policy. Strategically important issue is the realization of

the final produced products in the global markets that require a quality corresponding to the world level of competitiveness of the goods. In this area, appropriate program documents were adopted. To date, Kazakhstan aims to get into thirty developed countries by 2050 (Address by the President of the Republic of Kazakhstan, 2014).

In this context, it is important timely evaluation of implemented industrialization and competitiveness policies. This paper specifically examines the industrialization effect on competitiveness of Kazakhstan. Thus, the purpose of the study is to assess the competitiveness of the national economy in terms of industrial and innovation development.

## 2. RESEARCH METHOD

The research method aims at determining the characteristics, factors and indicators of competitive development of Kazakhstan in terms of industrialization.

The object of the research is the economy of the Republic of Kazakhstan by regions. The subject of the study is economic relations arising in the process of formation of a competitive economy in the conditions of industrial-innovative development.

The study applies generally accepted methods of scientific research (analysis and synthesis, induction and deduction, grouping, ranking, comparison, statistical analysis).

In accordance with the objectives of the study in order to assess the impact of industrial-innovative development program on competitiveness in the context of regions of Kazakhstan, a methodology should be based on the following three factors:

- effective functioning of the economic mechanism of the region (the competitiveness of the market competitiveness of products or competitiveness provided by the production);
- investment attractiveness of the region (the presence of innovation and infrastructure and industrial building);
- in addition to these economic factors, it is important to assess as a separate level of quality of life of the population factor, because this factor is the final result of all the activities along the chain from industrialization to competitiveness.

In the international practice, a lot of other socio-economic factors are used together with these three factors, which eventually accounts for the construction of indexes and ratings. Among them, widely known ratings are rating of the World Economic Forum (Schwab, 2016) and the Institute for Management Development (IMD) that includes more than 300 metrics, (Institute for management development, 2016), Atlas method of the World Bank (World Bank, 2016), methods of OECD (Durand, M., 1987) and the United Nations. According to the WEF rating in recent years, Kazakhstan has shown good results, having entered to the top 50 most competitive countries. Rating of WEF includes more than 140 countries, compared with about 60 countries in the IMD rankings, therefore, relatively more preferable rating for Kazakhstan. Moreover, in addition to the quantitative advantages, there are and qualitative benefits since WEF ranking indicators consist 2/3 of the expert survey data (IMD - 1/3).

However, in spite of the existing set of procedures, there is no unified methodology of assessing the competitiveness of producers, industries and regions recognized by all institutions.

Due to the fact that the international ratings take into account a wide range of socio-economic nature, and some of them such as a spread of HIV, malaria, etc. are not included in the scope of this study. According to this research objectives the focus will be on the factors of industrial-innovative development and the quality of life.

Method of estimation of competitiveness on the basis of trade data (Balassa index and the coefficient of net exports), as well as the assessment of the competitiveness of exports are commonly used along with the ratings in the international practice:

Balassa index -  $RCA_j = \frac{X_{ij}}{X_{wj}} \div \frac{\sum_j X_{ij}}{\sum_j X_{wj}}$ , where  $X_{ij}$  – export of a good  $j$  of a country  $i$ ,  $X_{wj}$  – world

export of a good  $j$ ; if  $j$  ( $X_{ij}/X_{wj}) > \sum X_{ij}/\sum X_{wj}$ ,  $RCA_j > 1$  – then a good has a relative competitiveness

Net exports coefficient -  $RCA_j = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}}$ , where  $X_{ij}$  – export of a good  $j$  of a country  $i$ ;  $M_{ij}$

– import of a good  $j$  of a country  $i$ ; if  $RCA < 0$ , this shows that a country produces this good with high costs,  $RCA > 0$  means a comparative advantage.

However, these techniques are aimed at assessing the industry (particular commodity market), which limits their use in this study. This study aims to assess the competitiveness of the national economy.

At the same time, within the framework of the existing financial possibilities and the high cost of conducting surveys, research restricted with the use of statistical information.

However in accordance with the international methodology index method has been selected as a base method which can compile an aggregate index of competitiveness. The index is calculated by the aggregation of a number of different indicators. Assessment method uses the index method to construct an aggregate index of competitiveness of the region by the aggregation of a number of different social and economic indicators. Calculations were carried out similarly to the methodology of the ratings of countries. The main feature of this method is to bring the different indicators (percent, absolute value, etc.) to one dimension in the range [0; 1].

The calculation is performed using the following formulas (1)-(3):

$$I_j^i = \frac{X_i^j - X_{\min i}}{X_{\max i} - X_{\min i}} \quad (1)$$

$$I_j^i = 1 - \frac{X_i^j - X_{\min i}}{X_{\max i} - X_{\min i}} \quad (2)$$

$$I_{\text{aggregate}} = \frac{\sum I_j^i}{n} \quad (3)$$

where  $X_i^j$  - indicator  $i$  of region  $j$ ;

$X_{\min i}$  – the minimum value of the index  $i$  among all regions  $j$ ;

$X_{\max i}$  – the maximum value of the index  $i$  among all regions  $j$ .

$I_{\text{aggregate}}$  value is in the range [0; 1]. If the  $j$ -th region by all the individual indicators is the best,  $I_{\text{aggregate}}$  will be equal to 1.

This method allows to assess the regions in terms of competitiveness taking into account the factors which are of research interest. It is possible to rank the competitiveness of regions according to the following grouping:

Group 1 - high level of competitiveness:  $0,66 < I < 1,0$ ;

Group 2 - medium level of competitiveness:  $0,33 < I < 0,65$ ;

Group 3 - low level of competitiveness:  $0,00 < I < 0,32$  [Nurmuhanova, 2007, p.78].

Presented method of analysis of the competitiveness of a state and its regions allows to see the formation of a competitiveness of the national economy and the impact of factors of competitiveness at the micro and macro level. Earlier this method was considered by several

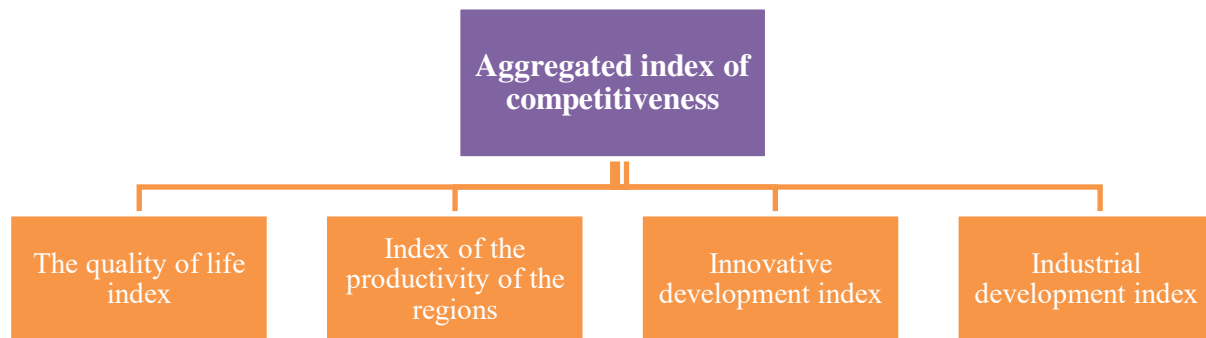
researchers in the evaluation of regional competitiveness. In Russia, the CIS countries, including Kazakhstan (Nurmuhanova, Institute for Marketing and Analytical Research) methodology underwent an approbation. Model in this paper is variation of the basic model presented in 2007 in the article of G. Nurmuhanova published in the Bulletin of the National Academy of Sciences.

To date, the method of the region is based on three main aspects of competitiveness: the need to achieve a high level of quality of life of the population, improving the functioning of economic mechanisms in the region (to ensure the competitiveness of the commodity market or the competitiveness of industry), the investment attractiveness of the region (the potential of regional innovation and infrastructure). Thus, the main indicators of improving the competitiveness of the country's regions are as follows:

- an indicator of the standard of living (index);
- an index of the productivity of the regions;
- innovative development index;
- an indicator of the level of infrastructure development in the region (Industrial development index).

Each of these indices is composed of independent sub-indices (Figure 1).

Ranking is determined by the competitiveness of the region's 4 aggregate indices:



*Figure 1: Components of aggregated competitiveness index  
(compiled by the author on the basis of Nurmuhanova, p.85)*

1. The quality of life index. Consists of subindex of gross regional product (GRP) per capita, purchasing power of the population, level of unemployment, poverty (percentage of the population with incomes below the subsistence level), maintenance with housing, public health care.
2. Index of the productivity of the regions. Consists of subindex of labor productivity, investment activity in the region, distribution of agricultural and industrial enterprises (business density), human capital (human resources).
3. Innovative development index. Consists of subindex of expenditure on research and development (% share in the total cost), the cost of technological innovation, the cost of information technology (% share in the total cost), the number of high-level IT professionals (% share in total employment), cost of business entities to research and development, the volume of imports of technology and equipment, the volume of industrial production of improved products, the share of high-tech products in the export.

It is worth noting that there is no statistical information on many indicators of the basic model (Nurmuhanova, 2007, p.83) based on 2005 data on innovative development index components. As a result, innovative subindices may lose efficiency in the original model. Thus, it is recommended to replace the sub-indices of innovative development index with actual and available indicators from the Statistics Committee of the Ministry of the national economy of the Republic of Kazakhstan (Table 1).

*Table 1: Components of the innovative development index in basic and advanced models  
 (compiled and improved by the author on the basis of Nurmuhanova, p.79)*

<b>i</b>	
Research and development costs (% share in total costs)	E
	O
C i	Personnel engaged in research and development
The number of IT professionals (% share in total employment)	L
C	I
	Cost of product and process innovations
o	V
The share of high-tech products in the total export	V s
	Number of companies introduced new or significantly improved goods and services
	Number of created/used new technologies and techniques
	Number of businesses that created/used new technology and equipment

4. Industrial development index. Consists of the main assets of the enterprises of the region; investment in construction, the volume of construction works; road density, the density of the railways.

It should be noted that this index is called infrastructure index in the basic model. Infrastructure index was expanded with the indicators in accordance with the target parameters of the State program of forced industrial-innovative development of Kazakhstan (industrial output, its growth, the share of the regions in the national volume of industrial production, share in GRP structure, production of manufacturing industry, its growth and share in GRP structure, labor productivity in the manufacturing sector (table 2).

Replacing innovative development index with actual indicators of innovative activities and extending infrastructure index to industrial development index could be seen as a research novelty of this study.

*Table following on the next page*

*Table 2: Components of the industrial development index in the basic and advanced models.  
 (compiled and improved by the author on the basis of Nurmuhanova, p.79)*

<b>Infrastructure index</b>	<b>Industrial index</b>
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(Basic model)	(advanced model)
Fixed assets of enterprises in the region	Fixed assets of enterprises in the region
Investment in construction	Investment in construction
The volume of construction and installation works	The volume of construction and installation works
The density of roads	The density of roads
Density of railways	Density of railways
-	The volume of industrial products (goods and services)
-	Share of regions in the republican volume of industrial production
-	The index of physical volume of industrial production
-	Share of regions of the republican volume of industrial processing
-	The share of manufacturing in GRP
-	The volume of production in the manufacturing industry
-	The index of physical volume of manufacturing industry
-	Labour productivity in the manufacturing industry
Note – compiled on the basis of the literature [1], improved by the author.	

Competitiveness of regions of Kazakhstan are assessed as of end of 2014 as in this period first five-year plan of industrialization – the State Program of Forced Industrial-Innovative Development of the Republic Kazakhstan – was finished. Moreover, values of indicators were accumulated through 5 years of the first industrialization program.

### 3. RESULTS

Low level of quality of life of population is observed in Zhambyl and Almaty regions. This is due to high population density and the mismatch of infrastructure. In Zhambyl there is the lowest level of GRP, high levels of poverty and poor housing. The leading place in living standard is occupied by the city of Almaty, which is the epicenter of the small and medium-sized businesses. Accordingly, it has a well-developed industrial sector. The standard of living in Almaty is at the highest level (higher than 0.80 points) and shows the highest rate of all the constituent elements of the index. After Almaty high standard of living is observed in Astana (around 0.60 points), which gives way in the level of purchasing power and unemployment.

The productivity of the regions in the country shows that the average level of the index is in the middle level. Nevertheless, the first places are occupied by South Kazakhstan and North-Kazakhstan regions. The individual components that make up the region's productivity, in particular, investment activity, human capital and labor productivity play an important role in the North-Kazakhstan region. In South Kazakhstan availability of agricultural and industrial enterprises has a primary influence on the level of productivity.

*Table following on the next page*

*Table 3: Aggregate competitiveness index and its components (authors' own calculations using data from the Statistical Yearbook, 2015)*

Regions	The quality of life index	Index of the productivity of the regions	Innovative development index	Industrial development index	Aggregated index of competitiveness
Akmola region	0.33	0.46	0.20	0.33	<b>0.33</b>
Aktobe region	0.33	0.33	0.15	0.25	<b>0.26</b>
Almaty region	0.2	0.54	0.18	0.34	<b>0.31</b>
Atyrau region	0.4	0.15	0.16	0.51	<b>0.31</b>
West Kazakhstan	0.35	0.26	0.09	0.21	<b>0.23</b>
Zhambyl region	0.16	0.59	0.22	0.28	<b>0.31</b>
Karaganda region	0.42	0.44	0.24	0.50	<b>0.40</b>
Kostanay region	0.32	0.48	0.35	0.28	<b>0.36</b>
Kyzylorda region	0.29	0.39	0.09	0.16	<b>0.23</b>
Mangystau region	0.30	0.28	0.08	0.36	<b>0.25</b>
South Kazakhstan	0.37	0.60	0.31	0.35	<b>0.41</b>
Pavlodar region	0.34	0.19	0.37	0.33	<b>0.31</b>
North Kazakhstan	0.38	0.72	0.17	0.22	<b>0.37</b>
East Kazakhstan	0.29	0.35	0.45	0.44	<b>0.38</b>
Astana city	0.60	0.35	0.74	0.32	<b>0.50</b>
Almaty city	0.74	0.28	0.55	0.4	<b>0.49</b>

Labor productivity is relatively high in Karaganda, Mangystau region and North Kazakhstan. Investment activity is higher in Akmola, Zhambyl regions, North and South Kazakhstan.

Investment activity is characterized by investments in construction and fixed assets, it is the dominant factor determining the competitiveness of the regions. Coefficients of renewal of fixed assets, including equipment modernization, expansion of the manufacturing process affect the volume of introduced new facilities.

According to the statistical data used to calculate the index of innovation, we can conclude that the city of Almaty in the lead in the field of research, Astana and East Kazakhstan lead in the area of innovation. It should be noted that these regions have introduced new or significantly improved goods and services.

According to the index of innovative development Astana and Almaty have the highest rate (0.74 and 0.55 correspondingly). The innovative development of the country, excluding the cities of Astana and Almaty, on average, at a low level (0.20).

The low level of scientific and technological innovation and development in some regions is due to the lack of funding or the suspension of research.

In turn, the lack of funds for innovative development leads to the fact that young scientists are leaving the area of science. In addition there is a moral and physical aging of the material and technical base.

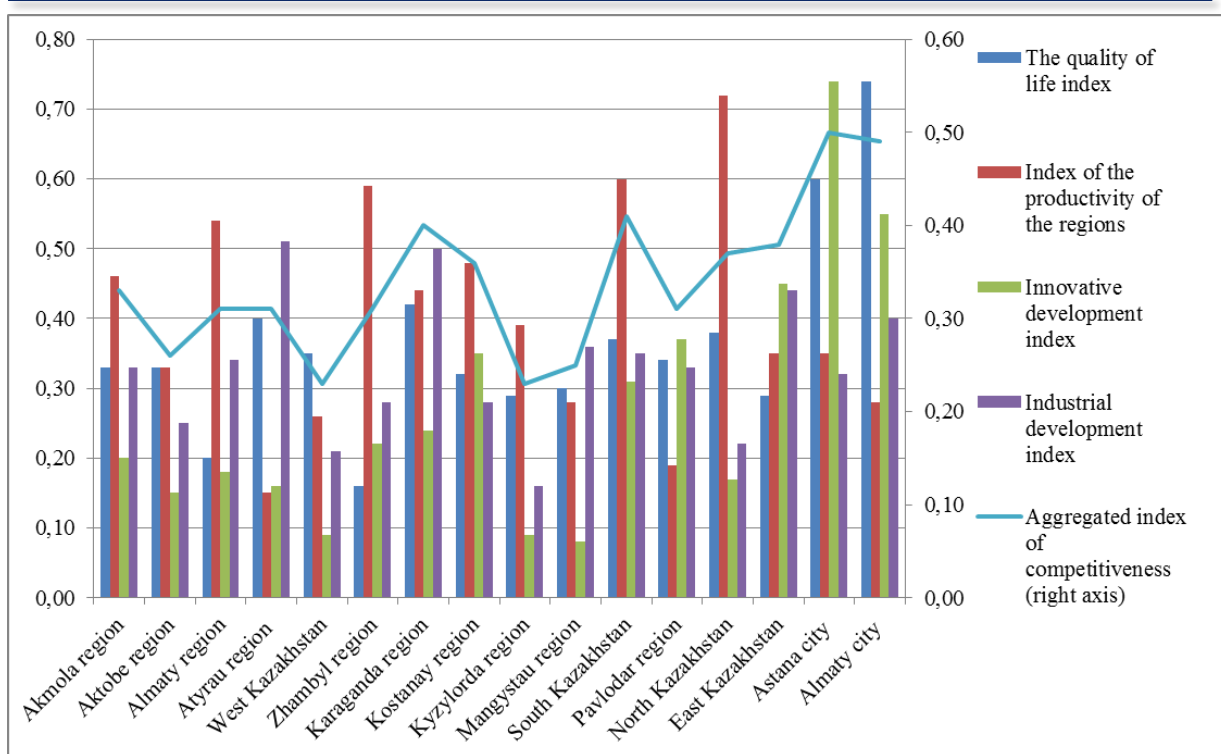


Figure 2: Aggregate index of competitiveness and its components (authors' own calculations using data from the Statistical Yearbook, 2015)

The highest overall index of competitiveness was estimated for Astana and Almaty (around 0.50), while the republican level of competitiveness remains low (within 0.30). The lowest level of competitiveness is in the Western Kazakhstan and Kyzylorda.

Low level of innovative development in regions of Kazakhstan indicates a lack of attention to the development of scientific and technical potential. The development of science in Kazakhstan, compared with the industrialized countries has the principal features of the development of science. In developed countries, there is a tendency of growth of financing of fundamental and applied research, the development of innovation through the integration of science and the private sector. In developed countries, the creation and support of the formation of the world's scientific and technical potential is aimed at solving economic and social problems. For example, the EU offers to all countries of the Union to increase investments in science up to 2.5% of GDP. Over the past 5 years in Kazakhstan, this indicator of science financing was 0.2%, which is insufficient.

The highest industrial development indicators was observed in Atyrau, Karaganda and East Kazakhstan regions. Nevertheless, it should be noted that in general, the average level of industrial development in the republic remains below 0.50. The leading positions of the above regions are associated with the presence of the fixed assets and large oil and coal companies.

Grouping regions by competitiveness gave the following conclusions:

- In most regions competitiveness is in the medium level;
- The performance of the regions as a whole remains at a low level throughout the republic (around 0.30 points);
- The level of innovative development is relatively high in Astana, Almaty, Kostanay, South Kazakhstan, Pavlodar and East Kazakhstan regions, in other regions this figure is less than 0.3 (out of a maximum of 1.0).
- Relatively high level of industrial development is in the Atyrau region, Karaganda, East Kazakhstan regions.



Competitiveness of the Republic Kazakhstan depends on the competitiveness of each region. Each region contributes to the development of the national competitiveness.

The research findings showed the low level of competitiveness of regions (the highest figure is closer to 1, and a low to 0). It should be noted that the average level of the scale interval 0,33-0,66. In the cities of Almaty and Astana aggregate competitiveness index is relatively high and is about 0.50, which generally corresponds to the average level of competitiveness. Astana and Almaty cities are not industrial areas, but these areas have a high level of innovation and research. Nevertheless, this level is not high enough in general. As a result, the combination of the existing infrastructure, industrial resources with innovation, increases productivity in the region, which in the end improves the quality of life in the region.

The lowest level of competitiveness is in the West Kazakhstan and Kyzylorda region, which was caused by a low level of innovation. Also, these regions do not use the full potential of its infrastructure. In general this led to the low productivity and hence poor quality of life.

The evaluation showed that the industrial-innovation factors are the basis for improving competitiveness. But, compared to the industrial and infrastructural indicators, innovation factors are more related to competitiveness. Thus, the industrial-innovative development affects the competitiveness of the region, which later forms the country's competitiveness.

#### 4. CONSLUSION

This study assessed the competitiveness of the national economy of Kazakhstan (by region) for the period of implementation of the State program of industrial-innovative development of Kazakhstan. Assessment method used the index method to construct an aggregate index of competitiveness of the region by the aggregation of a number of different social and economic indicators (index of quality of life, index of productivity of region, innovative development index, industrial development index). Innovative development index was constructed in a new way taking into account actual indicators of innavtive activity, and infrastructural index was extended to industrial development index, which represents a research novelty of this study. Calculations were carried out similarly to the methodology of the ratings of countries. The main feature of this method is to bring the indicators of different measures such as percentage, absolute value to one dimension in the range [0; 1]. Research results showed that the level of the competitiveness in the Republic of Kazakhstan in general remains very low except in the capital city Astana and the former capital Almaty where competitiveness relatively higher but still it is in the middle of the range [0; 1]. Findings show that although Astana and Almaty are not industrial areas, but these areas have a relatively higher level of innovation and research. As a result, the combination of the existing infrastructure and industrial resources with innovation increases productivity in the region, which finally improves the quality of the life in the region. This means that the industrial-innovation factors are the basis for improving competitiveness. But, compared to the industrial and infrastructural indicators, innovation factors are more related to competitiveness. Overall, the industrial-innovative development affects the competitiveness of the region, which later forms the country's competitiveness.

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